

TOMATO VARIETY EVALUATION FOR PROCESSING - 1960

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Department of Horticulture Mimeo Series No. 206

OHIO AGRICULTURE

MAR 31 1960

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The 1959 tomato variety trials included ten varieties which grew in replicated plots under acceptable commercial practices at Columbus, Ohio. Each variety was harvested at regular intervals.

Quality was determined as follows (the results as reported in the following tables are the average values):

Size or Average Count per 25 Pounds - The total number of tomatoes per 25 pounds.

Raw Grade - The U.S. Grade was determined in accordance with the U.S. Standards for Tomatoes for Canning. The number 2's were separated into those that were 2's for COLOR and those that were 2's for DEFECTS. All grading was done using the Macbeth (Examolite) daylight type lamp with no other light (artificial or natural) interfering.

Agtron F - The Agtron "F" values were determined using 70 as a standard. Samples were taken at the extractor and from the finished canned juice after approximately three (3) months' storage.

Total Acid - Determined by direct titration and calculated as percent citric acid.

pH - Determined with the Beckman Zeromatic pH meter.

Vitamin C or Ascorbic Acid - Determined by Dye titration and calculated as milligrams per 100 grams.

Percent Soluble Solids - Determined from the refractive indice using the Abbe '56 refractometer.

U. S. Grade for Canned Tomatoes - The U.S. Grade was determined in accordance with the U. S. Standards for Grades of Canned Tomatoes.

U. S. Grade for Tomato Juice - The U. S. Grade for Tomato Juice was determined in accordance with the U.S. Standards for Grades of Canned Tomato Juice.

Viscosity - Determined by using an efflux tube (GOSUC) - Consistometer using a 3/64 inch opening and standardized at 23 seconds at 25° C. with water.

Hunter L, a and b - Determined with the Hunter Color and Color Difference Meter. This instrument was standardized at L, 25.59; a, 27.40 and b, 12.54.

General Comments on this year's trials are: Low yields, poor quality of raw product (extremely soft fruit) produced very low drained weights in finished product. The above can be attributed to extreme dry weather during maturation of fruits. Specific comments follow for each variety:

Rutgers - The standard variety for processing, in these trials medium sized, the highest total acid after processing, produced good tomato juice and fairly good canned tomatoes. This year's canned produce was not equivalent to the past five years' quality.

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Foremost E 21 - Fruit slightly larger than Rutgers, very uniform set of fruits, one of the highest in total acid in raw tomatoes, and fair color of juice and whole tomatoes.

Wisconsin 55 - Large fruit, lowest percent U.S. #1's, highest percent culls, low total acid in both raw and canned, poor color juice. (Not recommended due to poor raw product quality.)

K C 135 - Largest fruit, late variety, produced high viscosity juice, good color juice, canned tomatoes scored down on defects due to hard core. (Not recommended for peeling purposes.)

K C 146 - Medium sized fruit, uniform yielding variety, produced highest yield, highest percent U. S. #1's, high in Vitamin C, produced lowest viscosity juice, good color juice.

Glamour - Smallest fruit, high percent of U.S. #1's, lowest percent 2's for Defects, lowest percent culls, color improves after processing lowest raw soluble solids but one of the highest solids after processing, produced the highest viscosity juice.

The following varieties are new in the trials this year:

Fireball - Medium size fruit, very early variety, low total acid, low viscosity juice, good color juice, but poor color in whole tomatoes and low drained weight.

Early Bird F<sub>2</sub> - Small fruit, lowest yielding variety, lowest vitamin C content.

Morton Hybrid - Medium sized fruit and early variety, high pH in canned product, low total acid canned product. Average quality throughout.

Cardinal Hybrid - Large fruit, low pH in raw product, highest in vitamin C, fair color.

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Table I - Tomato Variety Evaluation - Raw Product Data - Columbus, 1959

| Variety         | Av. Count<br>Per 25 lbs. | Per Cent Yield by Harvest |      |      |      | Tons<br>Per Acre |
|-----------------|--------------------------|---------------------------|------|------|------|------------------|
|                 |                          | 8/18                      | 8/25 | 9/8  | 9/25 |                  |
| Rutgers         | 95.9                     | 24.0                      | 52.0 | 24.0 | -    | 4.5              |
| Foremost E21    | 89.9                     | 33.6                      | 38.0 | 29.3 | -    | 4.2              |
| Wisconsin 55    | 85.1                     | 29.6                      | 44.4 | 25.8 | -    | 4.7              |
| K C 135         | 79.2                     | 21.0                      | 38.0 | 40.8 | -    | 5.8              |
| K C 146         | 90.5                     | 29.0                      | 38.0 | 32.9 | -    | 7.7              |
| Glamour         | 103.0                    | 20.0                      | 46.5 | 33.4 | -    | 5.3              |
| Fireball        | 93.6                     | 53.7                      | 46.2 | -    | -    | 4.0              |
| Early Bird F2   | 99.4                     | 24.4                      | 48.9 | 26.6 | -    | 3.9              |
| Morton Hybrid   | 91.7                     | 33.4                      | 52.5 | 13.9 | -    | 5.5              |
| Cardinal Hybrid | 82.1                     | 28.9                      | 49.3 | 21.6 | -    | 6.4              |

## % U. S. Grade - Average

| Variety            | 1    | 2C   | 2D   | Cull |
|--------------------|------|------|------|------|
| Rutgers            | 56.5 | 16.8 | 14.4 | 7.7  |
| Foremost E21       | 62.4 | 18.3 | 12.3 | 7.5  |
| Wisconsin 55       | 54.8 | 21.1 | 15.5 | 10.7 |
| K C 135            | 65.6 | 19.7 | 12.3 | 4.8  |
| K C 146            | 75.3 | 12.0 | 10.7 | 4.5  |
| Glamour            | 71.1 | 15.1 | 9.3  | 1.2  |
| Fireball           | 59.8 | 18.4 | 19.0 | 4.6  |
| Early Bird F2      | 64.0 | 14.9 | 13.7 | 7.9  |
| Morton Hybrid      | 63.7 | 14.5 | 19.1 | 5.9  |
| Cardinal<br>Hybrid | 65.2 | 16.5 | 17.9 | 7.1  |

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Table II. Objective Quality and Chemical Analysis - Average values for replicates after four months' storage (raw and canned juice)

| Variety                   | Repli-<br>cates | pH  |        | Total Acid |        | Vitamin C<br>Canned | Canned Hunter |      |      | Agtron F |        | Soluble<br>Solids |        | Viscosity<br>Tomato<br>Juice |
|---------------------------|-----------------|-----|--------|------------|--------|---------------------|---------------|------|------|----------|--------|-------------------|--------|------------------------------|
|                           |                 | Raw | Canned | Raw        | Canned |                     | L             | a    | b    | Raw      | Canned | Raw               | Canned |                              |
| Rutgers                   | 5               | 4.1 | 4.2    | .83        | .61    | 18.0                | 24.9          | 23.6 | 13.4 | 48.6     | 52.0   | 5.1               | 6.4    | 43.7                         |
| Foremost E21              | 4               | 4.1 | 4.2    | .88        | .59    | 18.3                | 25.0          | 23.8 | 13.3 | 53.2     | 50.0   | 5.0               | 5.9    | 44.4                         |
| Wisconsin 55              | 5               | 4.1 | 4.2    | .68        | .55    | 18.2                | 25.1          | 23.1 | 13.5 | 46.6     | 52.4   | 4.8               | 6.0    | 43.8                         |
| KC 135                    | 5               | 4.2 | 4.2    | .64        | .57    | 18.0                | 24.5          | 24.2 | 12.9 | 41.7     | 47.0   | 4.9               | 6.2    | 44.8                         |
| KC 146                    | 4               | 4.2 | 4.2    | .73        | .55    | 19.5                | 24.0          | 23.0 | 12.8 | 39.2     | 47.0   | 4.4               | 6.1    | 42.2                         |
| Glamour                   | 3               | 4.3 | 4.2    | .63        | .51    | 18.8                | 24.2          | 24.5 | 13.0 | 47.1     | 46.0   | 3.5               | 6.4    | 45.7                         |
| Fireball                  | 3               | 4.2 | 4.3    | .39        | .54    | 18.0                | 24.5          | 24.9 | 13.3 | 43.3     | 47.3   | 6.5               | 6.0    | 43.8                         |
| Early Bird F <sub>2</sub> | 3               | 4.1 | 4.1    | .88        | .60    | 16.4                | 24.6          | 24.4 | 12.9 | 43.7     | 46.3   | 4.7               | 6.1    | 45.1                         |
| Morton Hybrid             | 4               | 4.1 | 4.3    | .77        | .52    | 17.7                | 24.1          | 23.8 | 12.8 | 43.0     | 45.8   | 5.1               | 6.0    | 44.4                         |
| Cardinal<br>Hybrid        | 4               | 4.0 | 4.2    | .86        | .55    | 20.1                | 24.2          | 24.1 | 12.7 | 42.2     | 46.2   | 4.8               | 6.0    | 44.6                         |

Agtron F standardized at 70. Lower values indicate better color.

Vitamin C - Milligrams per 100 grams of sample of canned product.

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Table III. Variety Evaluation of Tomatoes for Processing Tomato Juice  
(Average of replicate for field run tomatoes - all lots processed by  
"cold break" double extract, flash pasteurized.)

U.S.D.A. Grade Factors

| Variety                   | Replicates | Color | Consistency | Defects | Flavor | Total Score | Grade |
|---------------------------|------------|-------|-------------|---------|--------|-------------|-------|
| Putgers                   | 4          | 27.5  | 14.2        | 15.0    | 34.5   | 91.2        | A     |
| Foremost<br>E 21          | 4          | 26.5  | 14.8        | 15.0    | 33.5   | 89.8        | A     |
| Wisconsin<br>55           | 5          | 26.8  | 14.4        | 15.0    | 34.4   | 90.6        | A     |
| KC 135                    | 5          | 28.0  | 14.6        | 15.0    | 35.8   | 93.4        | A     |
| KC 146                    | 4          | 28.0  | 14.0        | 15.0    | 35.8   | 92.8        | A     |
| Glamour                   | 3          | 27.7  | 15.0        | 15.0    | 34.3   | 92.0        | A     |
| Fireball                  | 3          | 28.0  | 14.3        | 15.0    | 34.0   | 91.3        | A     |
| Early Bird F <sub>2</sub> | 3          | 27.7  | 14.3        | 15.0    | 34.3   | 91.3        | A     |
| Morton Hybrid             | 4          | 27.0  | 14.8        | 15.0    | 34.2   | 91.0        | A     |
| Cardinal Hybrid           | 4          | 27.2  | 14.8        | 14.8    | 35.0   | 91.8        | A     |

Color: (30 points) A, 26-30; C, 23-25\*

Consistency: (15 points) A, 13-15; C, 10-12

Absence of Defects: (15 points) A, 13-15; C, 10-12\*

Flavor: (40 points) A, 33-40; C, 27-32\*

\*Indicates limiting rule within grade classification.

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Table IV. Tomato Variety Evaluation - Canned Tomato Data, Columbus, 1959  
(all lots processed from Field Run Tomatoes)

| Variety         | Replicates | Drained<br>Weight<br>(ounces) | Drained<br>Weight<br>(20 pts) | Wholeness<br>(20 pts) | Color<br>(30 pts) | Defects<br>(30 pts) | Total<br>Score | Grade |
|-----------------|------------|-------------------------------|-------------------------------|-----------------------|-------------------|---------------------|----------------|-------|
| Rutgers         | 90         | 9.6                           | 14.5*                         | 17.0                  | 25.9*             | 28.8                | 95.8           | B     |
| Foremost E21    | 18         | 8.8                           | 12.8*                         | 15.2                  | 24.1*             | 28.3                | 89.2           | C     |
| Wisconsin 55    | 12         | 9.4                           | 14.5*                         | 15.4                  | 27.4              | 28.0                | 94.7           | B     |
| K C 135         | 60         | 9.2                           | 13.9*                         | 16.7                  | 26.0*             | 27.2                | 93.0           | C     |
| K C 146         | 72         | 9.8                           | 14.9*                         | 16.8                  | 26.4*             | 28.4                | 96.3           | B     |
| Glamour         | 30         | 9.7                           | 14.8*                         | 16.4                  | 25.4*             | 28.2                | 94.5           | B     |
| Fireball        | 18         | 8.6                           | 12.8*                         | 17.4                  | 25.6*             | 28.0                | 92.5           | C     |
| Early Bird F2   | 18         | 9.7                           | 13.8*                         | 16.1                  | 25.4*             | 28.0                | 93.0           | C     |
| Morton Hybrid   | 6          | 9.0                           | 13.2*                         | 17.2                  | 26.8              | 28.0                | 94.2           | C     |
| Cardinal Hybrid | 18         | 8.8                           | 12.6*                         | 17.0                  | 26.2*             | 28.0                | 92.6           | C     |

\* Indicates limiting rule within grade.

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